

Notes on the Tergipedid Nudibranchs of the Northeastern Pacific, with a Description of a New Species

by

DAVID W. BEHRENS

Pacific Gas & Electric Co., Biological Research Laboratory,
P.O. Box 117, Avila Beach, California 93424

Abstract. In the northeastern Pacific the family Tergipedidae is represented by 14 described species and at least 1 known undescribed species. The nomenclatural status of the family is reviewed and a new species, *Catriona rickettsi* Behrens, from California is described.

THE SYSTEMATICS of the family Tergipedidae Thiele, 1931, have experienced considerable controversy and nomenclatural confusion. Its taxonomic evolution has been reviewed by BURN (1973), MILLER (1977), and WILLIAMS & GOSLINER (1979). Modifications have followed with BROWN (1980), GOSLINER (1981), and GOSLINER & GRIFFITHS (1981). In the northeastern Pacific, species accounts are reported by MACFARLAND (1966), ROLLER (1969), LONG (1969), GOSLINER & MILLEN (1984), and JAECKLE (1984).

The generic status of *Catriona* Winckworth, 1941, *Cuthona* Alder & Hancock, 1855, and *Trinchesia* Ihering, 1879, has changed several times. MILLER (1977) found no clear separation between the genera. WILLIAMS & GOSLINER (1979) reestablished *Catriona* as a valid genus based upon the presence of bristles on the masticatory border of the jaw and the possession of more than 50 radular teeth. They also reported the family name Tergipedidae inappropriate and recommended Cuthonidae. BROWN (1980), while reviewing the British species, revised Williams & Gosliner on both these matters, following the nomenclature of MILLER (1977). GOSLINER & GRIFFITHS (1981), while not discussing Brown's revision, reemphasized the features separating *Catriona* from *Cuthona*, and stressed the importance of preradular teeth in *Catriona*.

Notes on the Tergipedidae of the Northeastern Pacific

Table 1 summarizes the tergipedid species known from the northeastern Pacific, and for which accurate collection data and/or voucher material is available. The list gives

the known geographical distribution of each species and the authors reporting those range limits.

THOMPSON & BROWN (1976) report "one doubtful record of" *Cuthona nana* (Alder & Hancock, 1845-55) from the Pacific coast of North America. No confirmable collection of *C. nana* is known from this coast. HURST (1967) reported *Catriona gymnota* (Couthuoy, 1838) (= *Catriona aurantia* Alder & Hancock, 1842) (fide WILLIAMS & GOSLINER, 1979; BROWN, 1980) from the vicinity of Friday Harbor Marine Laboratories, San Juan Island, Washington. ROBILLIARD (1971) documented collections of *Catriona columbiana* from this area, but not *C. gymnota*. Whereas the type locality of *C. columbiana* is Gabriola Pass, Vancouver Island region, British Columbia, and *C. gymnota* has not been reported since HURST (1967), it should probably be considered a misidentification.

BEHRENS (1980a:104) included four additional unidentified tergipedid nudibranchs. One, the La Jolla aeolid (species No. 158) remains undescribed. *Tergipes* sp. (species No. 160) has subsequently been described as *Cuthona phoenix* Gosliner, 1981.

The Lake Merritt aeolid (BEHRENS, 1980a:104, species No. 154) has also been listed by McDONALD & NYBAKKEN (1980:64) as *Cuthona* species A, and by McDONALD (1983:169) as *Trinchesia* sp., both from San Francisco Bay, California. This species was collected from Lake Merritt in 1967 by Dr. James T. Carlton. Subsequent to the publication of the color photograph in BEHRENS (1980a), Dr. Terrence Gosliner and Mr. Robert Burn brought to my attention the striking similarity between this species and *Cuthona perca* (Er. Marcus, 1958). *Cuthona perca* has been reported from an extremely wide geographical area, including Brazil (ER. MARCUS, 1958), Jamaica (EDMUNDS, 1964), Florida (EV. MARCUS, 1972), Barbados (MARCUS

Table 1

List of northeastern Pacific Tergipedidae.

Cuthona Alder & Hancock, 1855

- C. abronia* (MacFarland, 1966): Mukkaw Bay, Washington (ROBILLIARD, 1971)—Santa Catalina Island, California (JAECKLE, 1983)
- C. albocrusta* (MacFarland, 1966): San Juan Island, Washington (HURST, 1967)—Palos Verdes, California (McDONALD, 1983)
- C. cocochroma* Williams & Gosliner, 1979: Trinidad Bay, Humboldt Co. (JAECKLE, 1984)—Duxbury Reef, Marin Co., California (WILLIAMS & GOSLINER, 1979)
- C. concinna* (Alder & Hancock, 1843): Brandon Island near Nanaimo, Vancouver Island, British Columbia (O'DONOGHUE, 1922), Circum-polar
- C. divae* (Marcus, 1961): San Juan Islands, Washington (ROBILLIARD, 1971)—Point Loma, California (HAMANN, 1981)
- C. flavovulta* (MacFarland, 1966): Palmer's Point, Humboldt Co. (JAECKLE, 1984)—Shell Beach, San Luis Obispo Co., California (ROLLER & LONG, 1969)
- C. fulgens* (MacFarland, 1966): Duxbury Reef, Marin Co. (GOSLINER & WILLIAMS, 1970)—Shell Beach, San Luis Obispo Co., California (LONG, 1969)
- C. lagunae* (O'Donoghue, 1926): Palmer's Point, Humboldt Co., California (JAECKLE, 1984)—Punta Cabras, Mexico (HAMANN, 1981)
- C. perca* (Marcus, 1958): San Francisco Bay and Lake Merritt, Oakland, California (present study), Brazil (MARCUS, 1958), Jamaica (EDMUNDS, 1964), Florida (EV. MARCUS, 1972), Barbados (MARCUS & HUGHES, 1974), New Zealand (MILLER, 1977), Hawaii (GOSLINER, 1980)
- C. phoenix* Gosliner, 1981: Morro Bay (BEHRENS, 1980a), Mission Bay (GOSLINER, 1981) and La Jolla, California (BEHRENS, 1980a)
- C. pustulata* (Alder & Hancock, 1845): Salt Spring Island, Galiano Island, Strait of Georgia, British Columbia, Canada, and the northeastern Atlantic (GOSLINER & MILLEN, 1984)
- C. virens* (MacFarland, 1966): Duxbury Reef, Marin Co. (McDONALD & NYBAKKEN, 1980)—Santa Catalina Island, California (JAECKLE, 1983)
- C. species 1*: La Jolla, California (J. Lance, personal communication)

Catriona Winckworth, 1941

- C. columbiana* (O'Donoghue, 1922): Pearse Island, British Columbia (LAMBERT, 1976)—San Diego, California (LANCE, 1966), Japan (BABA & HAMATANI, 1963), South Africa (GOSLINER & GRIFFITHS, 1981)
- C. rickettsi* Behrens, spec. nov.: San Francisco Bay, California (present study)

Tenellia Costa, 1877

- T. adpersa* (Nordmann, 1845): San Francisco Bay (STEINBERG, 1963)—Morro Bay, California (McDONALD & NYBAKKEN, 1980), Europe, New England

& HUGHES, 1974), and New Zealand (MILLER, 1977) as *C. reflexa*, and Hawaii (GOSLINER, 1980).

The San Francisco Bay specimens match identically descriptions given in MILLER (1977) and GOSLINER (1980) for *Cuthona perca*. The radular length of 28 teeth fits well

within the range of 16 to 35 reported in the above references. GOSLINER (1980) reports 11 denticles per tooth. The San Francisco Bay specimens bear 5–10 denticles per tooth. The radular drawing presented in McDONALD (1983) matches closely that shown in GOSLINER (1980) for the Hawaiian specimens. The coloration of the specimens also matches closely that previously reported. The body is translucent grayish-white with white specks. The cerata bear numerous opaque white specks and a similarly colored subapical white band. The ceratal cores are olive-green.

The two localities where this species has been collected in California are a tidal lagoon, which due to its distance from the shore of San Francisco Bay is called a "lake," and the Palo Alto Yacht Harbor, South San Francisco Bay (BEHRENS, 1980b; McDONALD & NYBAKKEN, 1980; McDONALD, 1983). Both water bodies exhibit marked differences from California coastal waters; during the summer months they are quite warm and highly saline. The feasibility of the introduction of species such as *Cuthona perca* is discussed by CARLTON (1975, 1978, 1979) and MILLER (1969). At each of these localities, this species was feeding on the same sea anemone species, the introduced Asian anemone, *Halipanella luciae* (Verrill, 1898) (McDONALD, 1983; present study).

The fourth species listed in BEHRENS (1980a:104), *Trinchesia* sp. (species No. 161), is described in this paper. It was originally reported by BEHRENS & TUEL (1977), after being collected in San Francisco Bay in 1974. This *Catriona* is one of the most abundant aeolidacean species occurring year-round in south San Francisco Bay. Specimens have also been collected in La Jolla, California by Mr. James R. Lance.

Family TERGIPEDIDAE Thiele, 1931

Catriona Winckworth, 1941*Catriona rickettsi* Behrens, spec. nov.

(Figures 1 to 7)

References and synonymy:

- Trinchesia* sp.: BEHRENS & TUEL, 1977:35. CARLTON, 1979: 432. BEHRENS, 1980a:37. BEHRENS, 1980b:104.

Type material: (1) Holotype: One specimen approximately 13 mm long (preserved) collected from boat floats at Pete's Harbor, Port of Redwood City, San Francisco Bay, California (Lat. 37°30'02"N; Long. 122°13'23"W) on December 24, 1981, by David W. Behrens. This specimen is deposited in the collection of the California Academy of Sciences, Departments of Invertebrate Zoology and Geology (CAS), San Francisco, California (CAS Catalogue No. 029323). (2) Paratypes: A series of six specimens 8–15 mm long (preserved) collected concurrently with the holotype is also deposited in the CAS collection, Catalogue No. 029324. (3) A series of six specimens 6–9 mm long (preserved) collected at the type locality on April

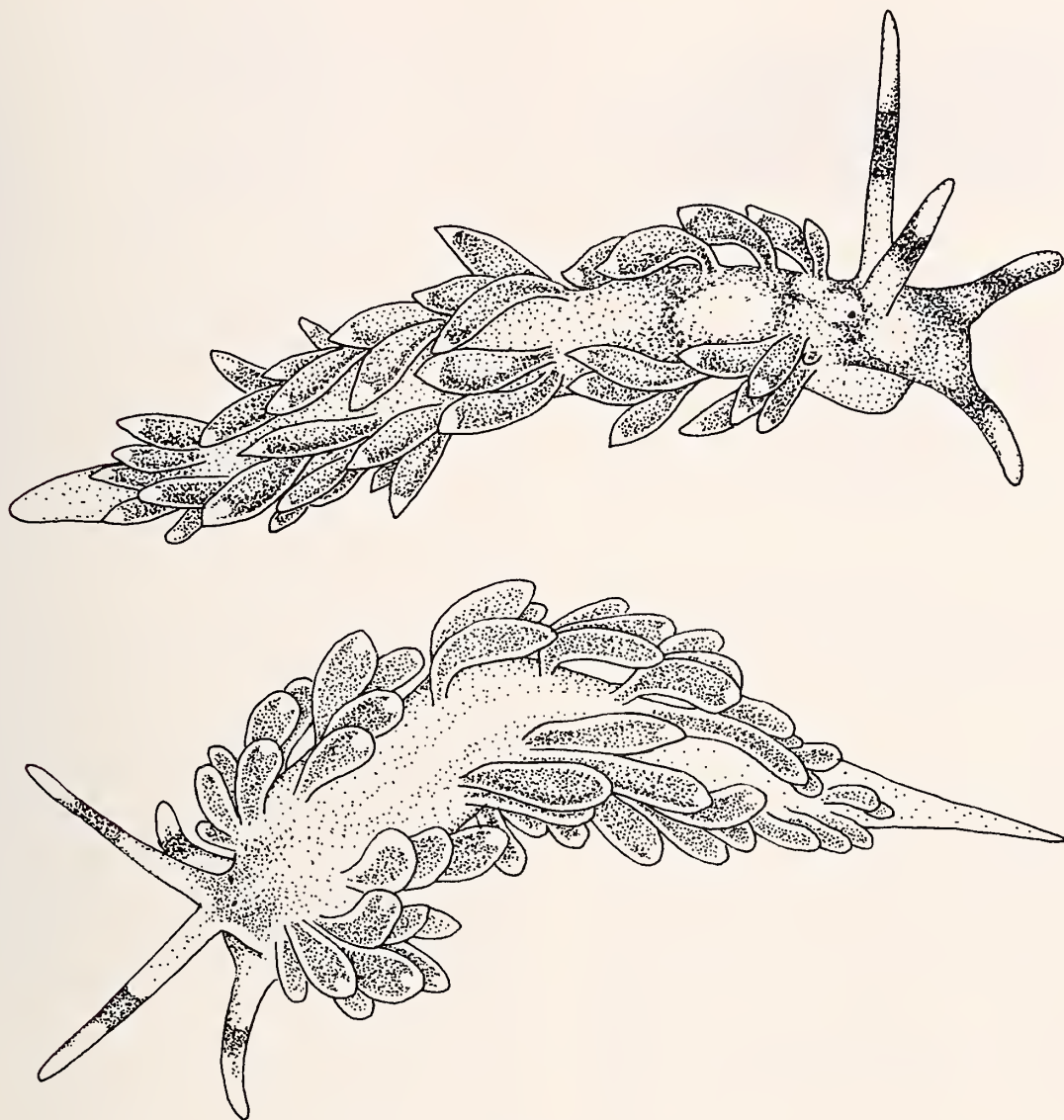


Figure 1

Catriona rickettsi spec. nov. Two specimens, each 18 mm in length. Pete's Harbor, Port of Redwood City, San Francisco Bay, California. Drawn from color transparencies.

18, 1981, is deposited in the type collection of Los Angeles County Museum of Natural History (LACM). Color transparencies of living *Catriona rickettsi* are on file at CAS (Nos. 3749, 3750 and 3751) and LACM.

Other material examined:

- (1) 18 specimens, Pete's Harbor, Port of Redwood City, San Mateo County, California; leg. David W. Behrens, 24 September 1974.
- (2) 20 specimens, Pete's Harbor, Port of Redwood City, San Mateo County, California; leg. David W. Behrens, 23 November 1978.
- (3) 12 specimens, Pete's Harbor, Port of Redwood City, San Mateo County, California; leg. David W. Behrens, 12 August 1979.
- (4) 25 specimens, Pete's Harbor, Port of Redwood City, San Mateo County, California; leg. David W. Behrens, 27 November 1980.
- (5) 15 specimens, Pete's Harbor, Port of Redwood City, San Mateo County, California; leg. David W. Behrens, 18 April 1981.
- (6) 20 specimens, Pete's Harbor, Port of Redwood City, San Mateo County, California; leg. David W. Behrens, 26 November 1981.

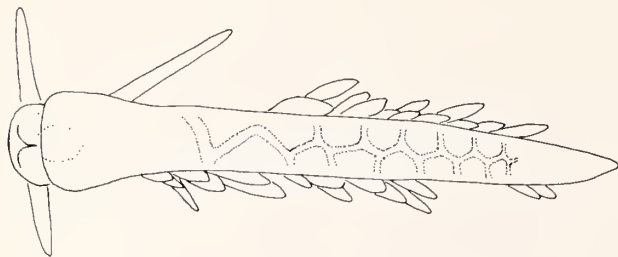


Figure 2

Ventral view of *Catriona rickettsi* spec. nov. 16 mm length. Pete's Harbor, Port of Redwood City, San Francisco Bay, California. Drawn from color transparency.

- (7) 18 specimens, Pete's Harbor, Port of Redwood City, San Mateo County, California; leg. David W. Behrens, 24 December 1981.

Description: The living animals measured up to 20 mm in length. Body is long, slender, tapering posteriorly. Tail is about $\frac{1}{5}$ the body length (Figure 1). The anterior portion of the foot flares slightly and is rounded (Figure 2). The foot is roughly $\frac{1}{10}$ as wide as long. The oral tentacles are long and slender and about $\frac{3}{4}$ the length of the rhinophores (Figure 1). The rhinophores are long, about $\frac{1}{5}$ – $\frac{1}{6}$ the length of the body, smooth to very slightly verrucose, and tapering. The cerata are arranged in 8–10 rows, the longest of which bears up to six cerata. There are up to four rows of cerata in the prepericardial group. Postpericardial rows alternate. A typical ceratal arrangement was 2.3.4 (prepericardial) and 5.6.3.1.1 (postpericardial). A single ceras (Figure 3), when fully extended, is approximately $\frac{1}{5}$ – $\frac{1}{6}$ the length of the body. Ceratal shape varies greatly from fusiform to a more club shape. The anus lies immediately in front of the dorsal-most ceras of the first postpericardial row. The genital apertures lie on the right side of the body, ventral to the first and second anterior rows of cerata.

The body is translucent, allowing many of the organs to be seen. In some larger specimens, the region between the rhinophores and the pericardium is yellow to orange. There is opaque white pigment on the distal $\frac{1}{3}$ of the rhinophores and cephalic tentacles and at the apex of the cerata. On the tentacles, this pigmentation is restricted to

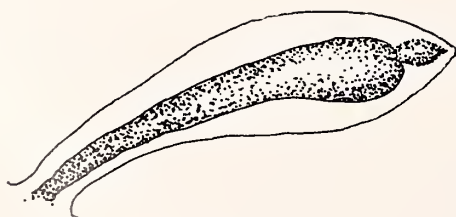


Figure 3

Ceras from *Catriona rickettsi* spec. nov.

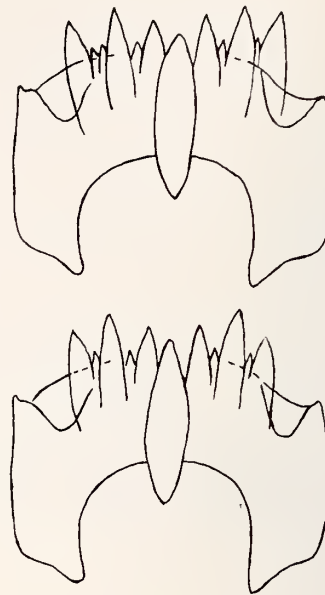


Figure 4

Radular teeth of *Catriona rickettsi* spec. nov.

the dorsal surface. An occasional white speck may occur on the surface of the cerata or on the notum. A band of orange is found below the white apices of the rhinophores and cephalic tentacles. This band may be nearly indiscernible on the tentacles in some individuals. The color of the ceratal core varies greatly, from yellow through orange, pink, red-brown, burgundy, or brownish-green. In some specimens the color may gradate from greenish, proximally, to reddish-brown below the white cap. A color

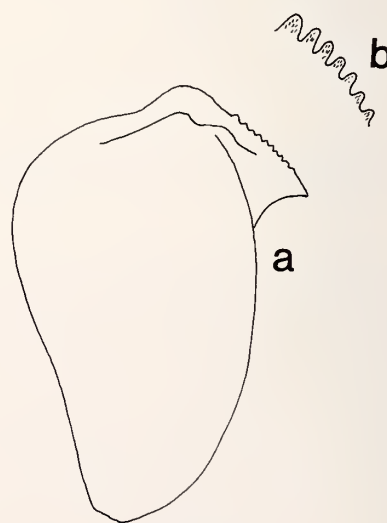


Figure 5

Jaw of *Catriona rickettsi* spec. nov. a, lateral view of jaw. b, masticatory border.



Figure 6

Penis of *Catriona rickettsi* spec. nov.

photograph of a specimen with orange cerata can be found in BEHRENS (1980a:105).

The long, tapering uniseriate radula is composed of up to 75 teeth, including three preradular teeth. Each tooth is a low horseshoe-shaped arch, with a deep articulatory socket on either side (Figure 4). The central cusp forms a long ridge that extends slightly below the blade of the tooth. There are 3–5 large denticles to each side of the cusp, three of which project further than the central cusp itself. One or two small denticles may be found between the larger ones (Figure 4). The consistency of these smaller denticles was confirmed using scanning electron microscopy (SEM). The jaws (Figure 5a) are lightly tinted gold, thin and oval. The masticatory process has a series of coarse denticles, with faintly discernible bristles (Figure 5b).

The reproductive system was typically tergipedid. The hermaphrodite glands are large, spherical to oval, tightly covered with elongated, inflated peripheral female acini. They extend posteriorly to the last division of the digestive gland and discharge into a median hermaphrodite duct. The ampulla is very long and convoluted. The vas deferens is very short. The penial gland is long, recurved and slightly inflated at its distal end. The penis is short, conical, and blunt (Figure 6). Upon dissection and clearing with 0.5 N quaternary ammonium hydroxide, it was found to be unarmed.

In South San Francisco Bay, *Catriona rickettsi* has been collected from a variety of fouling communities. Egg masses are present year-round, indicating the presence of this small, highly cryptic tergipedid. The egg mass (Figure 7) is typical of Type D (HURST, 1967), being an irregularly twisted, clear gelatinous string housing a spiral or folded string of white-cream eggs. A large egg string contains 12–30 eggs in cross-section (Figure 7b), with one egg per capsule. The mass is attached to the substratum, usually the stalk of a hydroid, by a very thin capsule-free jelly sheet. An average tangled mass measures about 2 by 6 mm.

The preferred substratum of this species seems to be *Tubularia crocea* (Agassiz, 1862), the hydranth of which the aeolid closely resembles, both in color and form. Other cnidarian species common in this locality are *Obelia* sp. and *Halipanelia luciae*, the latter of which also closely resembles the ceratal morphology of *Catriona rickettsi*.

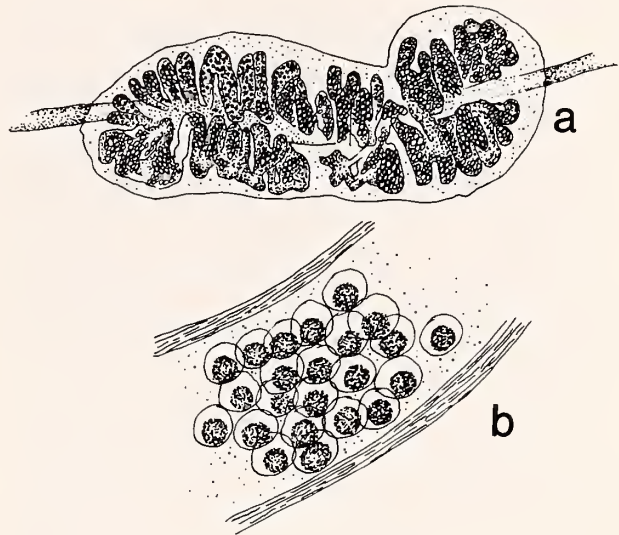


Figure 7

Egg mass of *Catriona rickettsi* spec. nov. a, whole egg mass (6 mm long) attached to hydroid stalk. b, view of single strand of egg string within a mass. Drawn from color transparency.

Discussion: Eight species are assigned to the genus *Catriona* based upon a long, tapering radula of greater than 50 teeth and the presence of a preradular tooth (GOSLINER & GRIFFITHS, 1981). Until this study, only Miller's *C. alpha* from New Zealand lacked a penial stylet. All species except *C. oba* Marcus, 1970, bear bristles on the masticatory edge of the jaw. Limited by these characteristics, assignment of *C. rickettsi* to this genus seems most appropriate.

Catriona maua Marcus & Marcus, 1960, and *C. oba* differ from *C. rickettsi* in that they bear a red line on the rhinophores. *Catriona gymnota* (Couthouy, 1938), *C. tema* Edmunds, 1968, and *C. casha* Gosliner & Griffiths, 1981, differ from *C. rickettsi* in having a subapical white band on the cerata. These species also have geographic distributions far from that of *C. rickettsi*.

In the northeastern Pacific, *Catriona rickettsi* most closely resembles *Catriona columbiana* (O'Donoghue, 1922). Differences in surface pigmentation (a highly consistent character in this genus), radular dentition, penial armature, structure of the masticatory border of the jaw, and the egg mass set the two sympatric species apart.

WILLIAMS & GOSLINER (1979) synonymized *Catriona alpha* Baba & Hamatani, 1963, with *C. columbiana*. The primary similarity was that of coloration. The particular features of coloration have been stressed by several authors. BABA & HAMATANI (1963) report in their description of the species that the holotype had "opaque white dots on the head region . . . and on nearly the whole length of the branchial papillae on their surface." They report also that the paratype had branchial papillae with an outer longitudinal, opaque-white line. MACFARLAND

(1966) in describing *C. columbiana* (as *C. spadix*) reports that the cerata bear a broad frosted-white band extending from base to tip. McDONALD (1983) describes the coloration of the species similarly. GOSLINER & GRIFFITHS (1981) report *C. columbiana* from South Africa. In their specimens, opaque white pigmentation covered the surface of the cerata, spreading to the notal surface. They report that the coloration agrees with that of the holotype of *C. alpha*, stating that, within the geographical range of *C. columbiana*, the external opaque white occurs over the whole surface or is restricted to a white longitudinal line or subapical band on the cerata. LANCE (1966), while reporting its collection in southern California, states that the color pattern of this species is distinct, enabling it to be readily distinguished from other aeolid nudibranchs. He reports that the antero-dorsal surface of all cerata, except the smallest, is covered with a highly contrasting, intense opaque-white pigment. The pigment was also present on the dorsal surface of the head as a triangular patch (LANCE, 1966; also see BEHRENS, 1980a:84). GOSLINER & MILLEN (1984) distinguish *C. columbiana* from all other sympatric species in Canadian waters by the white opaque ceratal line. *Catriona rickettsi* has none of the above-mentioned color patterns.

GOSLINER & GRIFFITHS (1981; fig. 15) present a comparison of the radular teeth of *Catriona*. Although striking differences occur between the four examples of *Catriona columbiana* presented (after O'DONOGHUE, 1922; BABA & HAMATANI, 1963; MACFARLAND, 1966; and GOSLINER & GRIFFITHS, 1981), the denticulation and morphology described here for *C. rickettsi* (3–5 large denticles between which lie 0–2 smaller denticles) remain substantially different enough for the purpose of species separation.

In the original description, O'DONOGHUE (1922) did not illustrate the penis or stylet of *Catriona columbiana*. In *C. rickettsi* the penis is short and blunt, not elongate and tapering as shown for any of the examples of *C. columbiana* given in GOSLINER & GRIFFITHS (1981). Additionally, the presence of a penial stylet was not described by BABA & HAMATANI (1963) for *C. columbiana* (as *C. alpha*). ROLLER (1969) confirmed the presence of a penial stylet in the Japanese *C. columbiana*. *Catriona rickettsi* has no such penial armature.

GOSLINER & GRIFFITHS (1981) describe the bristles on the denticles of the masticatory border of the jaw as large and clearly defined; ROLLER's (1969) description is similar. In *Catriona rickettsi*, the bristles are faintly discernible. This interspecific difference was confirmed by Dr. Kikutarô Baba (personal communication).

The egg mass of *Catriona columbiana* is a bag-like sac (Sandra Millen, personal communication) and not a spiral or folded string as is described here for *C. rickettsi* and is more typical of tergipedid nudibranchs (HURST, 1967).

MILLER (1977) identified specimens as *Catriona alpha* from New Zealand. His specimens reportedly differ from the Japanese specimens in a manner similar to the species from south San Francisco Bay described here. GOSLINER

& GRIFFITHS (1981), while comparing New Zealand material with that from South Africa and California, amplify the described differences between Miller's species and *C. columbiana*. The reported ceratal variability, lack of characteristic white markings, and lack of penial stylet closely match characters described here for *Catriona rickettsi*. Miller's specimens, however, lack bristles on the masticatory border of the jaw. Further examination of the New Zealand species is required to confirm its status.

The trivial name *rickettsi* is given in honor of Edward F. Ricketts (1897–1948) for his outstanding contributions in the field of philosophy and to our understanding of intertidal ecology. HEDGPETH (1978a, b) presents a chronology of the life of Ricketts, highlighting the man and his contributions.

ACKNOWLEDGMENTS

I would like to express thanks to my children, Jennifer and Michael Behrens, for their assistance in the collection of specimens for this description. Thanks also are due to Sandra Millen and the referees for their critical review of, and recommendations on, the manuscript. I also thank David Zoutendyk for providing the scanning electron microscopy of the radula.

LITERATURE CITED

- BABA, K. & I. HAMATANI. 1963. A cuthonid, *Cuthona alpha* n. sp., with a radula of *Catriona* type (Nudibranchia-Eolidacea). Publ. Seto Mar. Biol. Lab. 11(2):169–174.
- BEHRENS, D. W. 1980a. Pacific coast nudibranchs: a guide to the opisthobranchs of the northeastern Pacific. Sea Challengers Inc.: Los Osos, Calif. 112 pp.
- BEHRENS, D. W. 1980b. A review of the literature of the opisthobranchs of San Francisco Bay. Opisthobranch Newsletter 12(4–12):34–37.
- BEHRENS, D. W. & M. TUEL. 1977. Notes on the opisthobranch fauna of South San Francisco Bay. Veliger 20(1): 33–36.
- BROWN, G. H. 1980. The British species of the aeolidacean family Tergipedidae (Gastropoda: Opisthobranchia) with a discussion of the genera. Zool. J. Linn. Soc. 69(7):225–255.
- BURN, R. 1973. Opisthobranch molluscs from the Australian Sub-Antarctic territories of Macquarie and Heard Islands. Proc. Roy. Soc. Vict. 86(1):39–46.
- CARLTON, J. T. 1975. Introduced intertidal invertebrates. Pp. 17–25. In: R. I. Smith & J. T. Carlton (eds.), Light's manual: Intertidal invertebrates of the Central California Coast. 3rd edition. Univ. of California Press: Berkeley, Calif.
- CARLTON, J. T. 1978. History, biogeography and ecology of introduced marine and estuarine invertebrates of the Pacific coast of North America. Doctoral Thesis, Univ. of California, Davis, Calif.
- CARLTON, J. T. 1979. Introduced invertebrates of San Francisco Bay. Pp. 427–444. In: T. J. Conomos, A. E. Leviton & M. Benson (eds.), San Francisco Bay: the urbanized estuary, investigations into the natural history of San Francisco Bay and delta with reference to influences of man. Pacific Division, AAAS, San Francisco, Calif.
- EDMUNDS, M. 1964. Eolid Mollusca from Jamaica, with description of two new genera and three new species. Bull. Mar. Sci. Gulf Carib. 14(1):1–32.

- GOSLINER, T. M. 1980. The systematics of the Aeolidacea (Nudibranchia: Mollusca) of the Hawaiian Islands, with description of two new species. *Pacific Sci.* 33(1):37-77.
- GOSLINER, T. M. 1981. A new species of tergipedid nudibranch from the coast of California. *J. Moll. Stud.* 47:200-205.
- GOSLINER, T. M. & R. J. GRIFFITHS. 1981. Description and revision of some South African aeolidacean Nudibranchia (Mollusca, Gastropoda). *Ann. S. Afr. Mus.* 84(2):105-150.
- GOSLINER, T. M. & S. V. MILLEN. 1984. Records of *Cuthona pustulata* (Alder & Hancock, 1854) from the Canadian Pacific. *Veliger* 26(3):183-187.
- GOSLINER, T. M. & G. C. WILLIAMS. 1970. The opisthobranch mollusks of Marin County, California. *Veliger* 13(2):175-180.
- HAMANN, J. 1981. Range extensions of northeastern Pacific opisthobranchs. *Opisthobranch Newsletter* 13(6):21.
- HEDGPETH, J. W. (ED.) 1978a. The outer shores. Part 1. Ed Ricketts and John Steinbeck explore the Pacific Coast. Mad River Press Inc.: Eureka, Ca. 128 pp.
- HEDGPETH, J. W. (ED.) 1978b. The outer shores. Part 2. Breaking through. Mad River Press Inc.: Eureka, CA. 182 pp.
- HURST, A. 1967. The egg masses and veligers of thirty northeast Pacific opisthobranchs. *Veliger* 9(3):255-288.
- JAECKLE, W. 1983. Range extensions for two California cuthonids (Gastropoda: Nudibranchia) from Santa Catalina Island. *Opisthobranch Newsletter* 15(11-12):53.
- JAECKLE, W. 1984. The opisthobranch molluscs of Humboldt County, California. *Veliger* 26(3):207-213.
- LAMBERT, P. 1976. Records and range extensions of some northeastern Pacific opisthobranchs (Mollusca: Gastropoda). *Can. J. Zool.* 54:293-300.
- LANCE, J. R. 1966. New distributional records of some northeastern Pacific opisthobranchs (Mollusca: Gastropoda) with description of two new species. *Veliger* 9(1):69-81.
- LONG, S. J. 1969. Records of *Trinchesia virens*, *Trinchesia fulgens* and *Placida dendritica* from San Luis Obispo County, California. *Tabulata* 2(4):9-12.
- MACFARLAND, F. M. 1966. Studies of opisthobranchiate mollusks of the Pacific coast of North America. *Mem. Calif. Acad. Sci.* 6:xvi+546 pp., 72 pls.
- MARCUS, ER. 1958. Western Atlantic opisthobranchiate gastropods. *Amer. Mus. Novit.* 1906:1-82.
- MARCUS, EV. 1972. On some opisthobranchs from Florida. *Bull. Mar. Sci.* 22(2):284-308.
- MARCUS, EV. & H. P. I. HUGHES. 1974. Opisthobranch mollusks from Barbados. *Bull. Mar. Sci.* 24(3):498-532.
- MCDONALD, G. 1983. A review of the nudibranchs of the California coast. *Malacologia* 24(1-2):114-276.
- MCDONALD, G. & J. NYBAKKEN. 1980. Guide to the nudibranchs of California. American Malacologists, Inc.: Melbourne, Florida. 72 pp.
- MILLEN, S. V. 1983. Range extensions of opisthobranchs in the northeastern Pacific. *Veliger* 25(4):383-386.
- MILLER, M. C. 1977. Aeolid nudibranchs (Gastropoda: Opisthobranchia) of the family Tergipedidae from New Zealand waters. *Zool. J. Linn. Soc.* 60(3):197-222, 1 pl.
- MILLER, R. L. 1969. *Ascophyllum nodosum*: a source of exotic invertebrates introduced into west coast near-shore marine waters. *Veliger* 12(2):230-231.
- O'DONOGHUE, C. H. 1922. Notes on the nudibranchiate Mollusca from the Vancouver Island region. III. Records of species and distribution. *Trans. Roy. Canadian Inst.* 14(1):145-167, pls. 5 & 6.
- ROBILLIARD, G. A. 1971. Range extensions of some northeast Pacific nudibranchs (Mollusca: Gastropoda: Opisthobranchia) to Washington and British Columbia, with notes on their biology. *Veliger* 14(2):162-165.
- ROLLER, R. A. 1969. Nomenclatural changes for the new species assigned to *Cratena* by MacFarland, 1966. *Veliger* 11(4):421-423.
- ROLLER, R. A. & S. J. LONG. 1969. An annotated list of opisthobranchs from San Luis Obispo County, California. *Veliger* 11(4):424-430.
- STEINBERG, J. E. 1963. Notes on the opisthobranchs of the west coast of North America—IV. A distributional list of opisthobranchs from Point Conception to Vancouver Island. *Veliger* 6(2):68-73.
- THOMPSON, T. E. & G. H. BROWN. 1976. British opisthobranch molluscs, Mollusca: Gastropoda, keys and notes for the identification of the species. *Synopsis of the British fauna (new series)*, No. 8, Linn. Soc. London. 203 pp., 1 pl.
- WILLIAMS, G. C. & T. M. GOSLINER. 1979. Two new species of nudibranchiate molluscs from the west coast of North America, with a revision of the family Cuthonidae. *Zool. J. Linn. Soc.* 67:203-223.